

Application No. 10/675,049

Amdt. dated 9/2/05

Reply to Office action of 6/20/2005

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

Claims 1-17 remain in the application. Claims 1 and 13 have been amended. Claims 13-17 are subject to examination and claims 1-12 have been withdrawn from examination.

Contrary to the Examiner's indication in item 4 of the Office Action Summary, claims 1-12 are still pending. Rejoinder of method claims 1-12 is once again required after allowance of claim 13, under MPEP 821.04, which states "if applicant elects claims directed to the product, and a product claim is subsequently found allowable, withdrawn process claims which depend from or otherwise include all the limitations of the allowable product claim will be rejoined".

In "Claim Rejections - 35 USC § 102" on pages 2-3 of the above-identified Office Action, claims 13-17 have been rejected as being fully anticipated by U.S. Patent No. 5,484,484 to Yamaga et al. (hereinafter Yamaga) under 35 U.S.C. § 102(b).

As will be explained below, it is believed that the claims were patentable over the cited art in their original form.

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However, in order to make this even clearer, claims 1 and 13 have been amended.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 1 calls for, *inter alia*, a furnace for vapor phase depositing components contained in a process gas onto a plurality of semiconductor substrates, the furnace comprising:

- a process space for receiving the semiconductor substrates disposed one above another at a short distance to form a stack;

- a first feed/discharge line connected to said process space;

- a second feed/discharge line connected to said process space;

- a device for producing a process gas flow, said device for producing said process gas flow connected to said first feed/discharge line and/or said second feed/discharge line causing the process gas to flow laterally past the stack defining a main flow direction;

- a heating device; and

- a regulating unit for regulating a magnitude of said process gas flow and for changing the main flow direction by 180° while continuing to flow laterally past the stack.

Initially, it is noted that Yamaga is not concerned with the uniformity of wafers when processed in a CVD chamber, but rather tries to avoid the problem of the wafer having to be transferred many times while it is conveyed out of the

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reduced pressure CVD chamber, conveyed towards the other thermal processing station while accommodated in the carrier and then conveyed into the oxidation chambers so that particles can easily be adhered thereto. Therefore, Yamaga proposes a chamber in which both the nitridation of a silicon wafer as well as oxidation of the thus made silicon nitride can be performed in one and the same chamber. For that purpose, Yamaga proposes a double-walled chamber wherein the first processing gases will be introduced into one space and the second processing gases into another space of the CVD chamber.

However, the features recited in claim 13 of the instant application are neither taught nor suggested by Yamaga.

The Yamaga reference discloses a vertical thermal processing apparatus 1 having a heater chamber containing a heater 22 and a double-walled reaction tube 2 with an inner tube 2a and an outer tube 2b. A wafer boat 35 having wafers W is placed within the inner tube 2a. A first gas supply pipe 4 leads inside the inner tube 2a, and a second gas supply pipe 6 leads to a space between the inner tube 2a and the outer tube 2b. A first exhaust pipe 5 leads from the space between the inner tube 2a and the outer tube 2b, and a second exhaust

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pipe 7 leads from the region within the inner tube 2a. A portion control 20 controls valves V1-V4 in the pipes 4-7.

According to the method of Yamaga, the pipes 4 and 5 are used for a reduced pressure CVD process and the pipes 6 and 7 are used for an oxide process. More specifically, with regard to the application of the reference against the claims of the instant application, when the valve V1 is opened, a processing gas is supplied through the first gas supply pipe 4 "into a region within the inner tube 2a" as stated in column 5, lines 50-53 and shown in Fig. 3A of Yamaga. According to column 6, lines 28-32 and Fig. 3B of the reference, processing gases "are supplied into the space between the inner tube 2a and the outer tube 2b."

Claim 13 of the instant application in its previous form called for a process space for receiving semiconductor substrates in a stack, a first feed/discharge line and a second feed/discharge line. A device for producing a process gas flow is connected to the first feed/discharge line and/or the second feed/discharge line, so that the process gas flows laterally past the stack defining a main flow direction. The gas flow direction is reversed by a regulating unit by 180°.

As discussed above, the flow in Yamaga is seen in Figs. 3A

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and 3B. When the gases are introduced in the tube 2 of Yamaga, they flow from the pipe 4 within the inner tube 2a, past the silicon wafers W and then out through the pipe 5, without flowing past the wafers. Then the gases flow through the pipe 6 into the space between the inner tube 2a and the outer tube 2b and then out through the pipe 7, without flowing past the wafers. Even though the direction of the gases is reversed, the gases no longer flow past the silicon wafers when being pumped out of the chamber.

Therefore, the features of claim 13 of the instant application calling for:

"a device for producing a process gas flow . . . causing the process gas to flow laterally past the stack defining a main flow direction" and

"a regulating unit . . . changing the main flow direction by 180°"

are not taught or suggested by Yamaga, since in the reference there is no main flow past the stack which changes direction. Instead, the flow in Yamaga flows past the stack only once and then is discharged while not flowing past the stack. Nevertheless, in order to make the difference between the reference and the claim even clearer, claim 13 has been amended to call for:

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"a regulating unit . . . changing the main flow direction by 180° while continuing to flow laterally past the stack."

There can thus be no question that Yamaga does not teach or suggest the flow producing device recited in claim 13 of the instant application. Withdrawn method claim 1 has been similarly amended.

Furthermore, the Examiner states that Yamaga et al. teach the furnace according to claim 15 of the instant application, which calls for the regulating unit changing a main flow direction of the process gas flow at intervals in accordance with a variable time pattern. However, according to Yamaga, the main flow direction of the process gas is not reversed but rather another gas flows in another direction.

Additionally, the Examiner states that Yamaga teaches a plurality of platforms for supporting a plurality of substrates within a chamber and that the substrate can be rotated 180° during the deposition process and cites Fig. 1, reference sign W to support this argument. However, Applicant could find no teaching that the substrate can be rotated 180° during the deposition process in Yamaga. It is assumed that the Examiner meant that the wafers are rotated

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(in the XY-plane), but this has nothing to do with the present invention.

Clearly, Yamaga does not show a device for producing a process gas flow causing the process gas to flow laterally past the stack defining a main flow direction and a regulating unit changing the main flow direction by 180° while continuing to flow laterally past the stack, as recited in claim 13 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 13. Claim 13 is, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 13.

In view of the foregoing, reconsideration and allowance of claims 1-17 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

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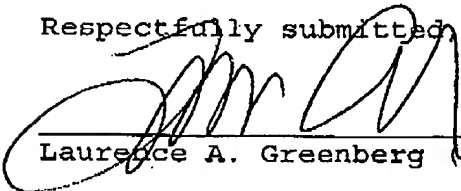
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If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith should be charged to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,



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LAG/bb

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